



H. P. BOHLANDER, W3VVS

for the

PHIL-MONT MOBILE RADIO CLUB

Five charter members met in December 1949 to organize the *Phil-Mont Mobile Radio Club*. The purpose in organizing a mobile club was to create interest in amateur mobile operations in the Philadelphia-Montgomery County (Pennsylvania) area. The three years which followed have seen the growth of an active mobile club, dedicated to public service, and numbering 35 active club members with approximately the same number of associated members. Many mobile Hams in "transient status" have attended the club meetings while in the Philadelphia area.

From the very beginning it became apparent that a common "net" frequency would be necessary, and since "surplus" crystals were available in quantity, a club frequency of 29.493 megacycles was chosen. In mobile net operations, it became evident that crystal switching for rapid QSY was necessary in order to handle traffic without hindering net operations. An alternate frequency of 29.626 megacycles was chosen. In this manner, net control can direct the mobile stations concerned to QSY and handle traffic directly without relay through the net control station.

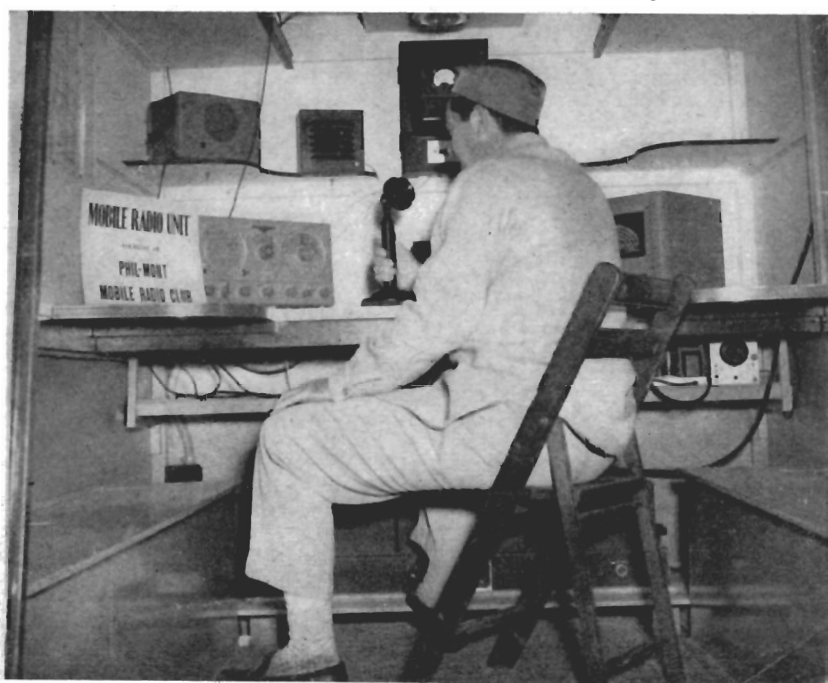
Although the majority of club members operate 10-meter mobile, we have members who operate 160-, 75-, 20-, and 2-meters. Perhaps the reasons for the

majority of members operating on 10-meters is due to the availability of commercial converters at reasonable cost, and the possibility of DX as well as local contacts. Six meters, which should be a good bet for mobile operations, was passed up for lack of local interest and activity in that band. Two meter operation has been attempted by some, but the mobile-to-mobile operation is not too successful in the greater Philadelphia area. Mobile-to-fixed station operation is successful, however.

Communication in the 10-meter band for mobile operation in this area has proven to be quite successful, and reliable ground-wave communication can be had over distances of up to 30 miles. By seeking the "ideal" location, the distance of point-to-point communication can be increased.

When the 10-meter band opens, it is bound to have an adverse effect upon mobile net operations, however, the QSY feature of the mobile stations is an assist to the problem. When such measures fail, the mobiles move closer together so that readability is again restored in spite of the QRM from distant stations. Under such conditions of operation it may be necessary for a message to be relayed through several mobile stations.

In many of the activities in which communication plays a part, there is need for a small, portable unit



Interior of the Phil-Mont Communications trailer with W3QFY at the mike.

(All Photos by W3CTT)



Phil-Mont's entry for the World's Smallest Mobile.

which can be transported to locations not accessible by automobile. This problem was solved by W3JLE, who constructed a "walkie-talkie." Since batteries are the source of power for such equipment, a compromise must be reached between power output, size, and weight. The power input of this particular unit is 375 milliwatts; nevertheless, it provides a communication link which is reliable up to approximately three miles.

The services which the *Phil-Mont Mobile Radio Club* render are varied and interesting. Twice the club has been called upon to assist in the marshalling of the New Jersey State Firemen's Association Parade at Trenton, N. J. This parade each year has consisted of over 100 bands, together with fire trucks and various apparatus. Mobile units located at the main approaches to the city of Trenton contact the parade units as they arrive, report arrival of the unit to net control, and then direct the unit to its proper position in the line of march. Mobiles then are dispersed throughout the length of the parade to "pace" the parade and maintain liaison as the parade progresses. These parades often take four and one-half hours to pass the reviewing stand.

The Lansdale (Pa.) Mardi Gras during the Christmas Season is usually marshalled and "paced" by *Phil-Mont* mobiles, as is the Glenside (Pa.) Fourth of July Parade.

Although parades come in for their share of club activities, Civil-Defense is always utmost in the mind of those who participate, and such mobile net activities provide many problems which are met and solved, placing the mobile Ham in a better position to cope with a possible emergency or disaster.

In January of 1951, the members of the *Phil-Mont Mobile Radio Club* participated in a network telecast over a local TV station. This Civil Defense program was given approximately one and one-half minutes on the *Camel News Caravan* with John Cameron Swayze. Many Hams must have viewed the

program as the mail response proclaiming approval came from all parts of the country. Ten mobiles took part in the demonstration from various locations in the area, with net control being located near the studios. A telephone patch carried the audio to the studio. One mobile on location in South Philadelphia was surprised, after having reported into the net control his position, to find the neighborhood flocking to his car saying they had just heard him on television! (Via the network, of course.)

July of 1951 gave the mobile club members a chance to try out direction finding equipment, another interesting phase of mobile operation. The *Bartol Research Foundation* sent aloft a meteorological balloon equipped with scientific instruments to record data taken while in the upper atmosphere. The balloon was equipped with a small 72-Mc transmitter by which the balloon's course could be plotted. Mobile d-f equipment took many forms, from converted TV front-ends, to super-regenerative receivers. Folded dipoles were used as the receiving antennas. W3PMD acted as net control, and W3QV, also a fixed station, coordinated reports and maintained liaison via telephone with the *Bartol Research Foundation*.

The *Phil-Mont Mobile Radio Club* assisted the Civil Air Patrol during one of their recent drills in checking flight procedures. Twelve mobiles positioned themselves at airfields throughout the immediate Pennsylvania and New Jersey area to report to net control the arrival and departure of participating aircraft which were not radio equipped.

A communications survey was made of Civil Defense of Bucks County, Pa. The *Phil-Mont Mobile Radio Club* communications trailer was placed at C-D Headquarters and mobiles travelled the entire county to assist in the plotting of "dead" areas.

Picnics at nearby parks are a family affair and take place several times each year. Two events which also are family affairs, are the boat races and the model airplane meet. The Delaware Regatta is an annual affair with the *Phil-Mont* net control station, W3RQZ, being located near the starting line. Liaison is maintained with the U. S. Coast Guard, and if any of the mobiles spot floating debris along the race course, the Coast Guard quickly removes it. Mobiles are stationed along the river as far north as Trenton, N. J., ready to report accidents, or notify the finish line of the location of a disabled boat, so that a car and trailer can be sent to retrieve the boat and driver.

The jointly sponsored Navy-Plymouth Dealers Model Plane Show at the Naval Air Development Center, Johnsville, Pa., offers another opportunity for an all-day outing. Each mobile receives a map of the area divided into grids. The *Plymouth Dealers* provide trucks to retrieve the models. A Navy "K" ship circles the area and advises Navy-Radio when a model is caught in a thermal. Navy-Radio has an intercom to our net control station, W3RQZ, which previously has been located in an unused "tower" on top of the hangar. Our net control can also spot models leaving the area from this vantage point. Mobiles are vectored to areas near the field, and when the model lands and is in sight, a request is made by the mobile for a retriever truck to rendezvous at a given location. The truck is then dispatched by net control to the exact location of the model. Only two or three of the

many models participating in these meets were lost because of such operations, and these models were found and returned to the Navy several weeks later. One mobile chased a plane for four miles before realizing it was a Piper Cub!

The mobile Ham's home station allies itself with mobile activity in many cases. Several members have vertical antennas and fixed frequency receivers operating such as to "guard" the net frequency. The drooping ground plane antenna fed with 50-ohm coaxial cable seems to work the best, with a coaxial antenna fed with 70-ohm line being second. An "eight-ball" mount, less spring, placed in the roof of the house, with eight-foot lengths of No. 12 wire drooped to follow the slope of the roof, works very well. A variation of this antenna is that of placing the antenna on a mast and guying it from four directions, breaking the guys with insulators to form the ground radials.

Fixed-frequency receivers are basic, either crystal controlled, or conventional superheterodyne circuits. The receivers are purposely made "broad" so as to receive stations near the club frequency. Time clocks are also used in some installations to control the receivers. Several systems of squelch have been employed, all of which have been taken from recently published articles. Crystal-controlled low-power transmitters complete the setup. Any mobile needing assistance, or desiring a QSO can usually get an answer in this area.

A great deal of the local interest in mobile operation can be attributed to the 24-hour guard station which until recently was manned under the call of W3CLM at one of the local BC stations by licensed amateurs who were willing to assume secondary duties as monitors.

Hidden transmitter hunts are a semi-annual affair. D-f equipment has been improved to such an extent that the transmitter is usually found well within the two hour period. Equipment most commonly used consists of a co-ax loop and t-f stage coupled to the mobile converter, or a folded dipole. The latter is somewhat bulky and difficult to handle in traffic. An S-meter is an additional refinement.

Once each month a news letter called "The TVI Retreat" is mailed to all club members. This paper contains news of interest to all the members and

consists largely of news contributions from the members themselves. In conjunction with this effort, a Technical Data Sheet is issued periodically at club meetings. These data sheets usually contain information based upon our mobile experience and are primarily of interest to the mobile Ham. Such subjects as noise limiters, elimination of tire static, etc., are presented. A recent data sheet catalogued noise elimination data by make and model of automobile.

Early in 1951 the need for a trailer equipped for communications was seen, and the first step was taken when the wheels, springs, and front axle of a 1933 Chevrolet were obtained. Members donated channel steel, two tires, tubes, and construction was begun. W3QQH, W3AAG, W3PMD, W3QFY, W3KCG, W3VVS, and others assisted in the construction and painting.

The trailer was designed to provide an operating position and convenient overhead stowage for all accessories, cables, etc. Benches over the fender wells serve to seat personnel, and are boxed in to provide additional storage space.

The main transmitter, a 50-watt converted police rig, was installed on the operating shelf but was later moved to the floor at the front of the trailer. Two antenna systems are used for the 10-meter band. A drooping ground plane antenna is built into the roof of the trailer using a standard mobile mount, and ground radials within the trailer framework run from the base of the antenna mount to each corner, then bend down the cornerposts for the remainder of length.

Antenna connections, a-c mains, a-c emergency power, remote control, and telephone circuits terminate in waterproof junction boxes located at the forward corners of the trailer. A 500-watt a-c alternator driven by a four-cycle, one-cylinder gasoline engine supplies emergency power. A line-monitoring a-c meter can be switched to either a-c main or emergency power, and the transfer to either power source can be made by a manually operated change-over switch. The emergency supply can be started remotely from battery, or by hand.

If when operating on a-c mains, the power should fail, the lighting circuit drops out and a 6-volt

(Continued on page 68)

Some of the members gather outside the trailer at a recent CD exercise. Standing (l. to r.) W3CTT, W5NYA, W3QFY, W3VVS, W3GIF, W3UXP, W3AAG, W3QQH, W3NIP, W3UIX and W3HYU. Kneeling (l. to r.) W3EXY, W3IM, W3SGR, W3JGB, W3IW, W3FFP and W3PXY.



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(from page 66)

in the evening. However, high daytime absorption will generally not permit much DX during the late morning or early afternoon hours. . . Fair to good conditions are expected on forty meters, with some good openings during propagationally stable periods. . . Some eighty-meter DX possible, but signal levels may be very weak, and very often below the atmospheric noise levels.

Asia

Long distances, high absorption, and auroral zone penetration make Asiatic DX quite difficult to work from the U.S.A. No ten-meter openings expected. . . There is a very slight possibility, from the eastern area of the U.S.A., of an occasional erratic fifteen-meter opening to Asia Minor. More frequent fifteen-meter openings should be possible between the western U.S.A. and the Far East, with some of these openings extending to the central area of the U.S.A. . . Twenty-meter DX conditions are rather good from the western U.S.A. to the Far East, but are no better than fair to the Central and Eastern areas. . . Not much expected on forty—but some DX openings are possible. . . Seasonally high noise levels will not permit much eighty-meter DX on these circuits—certainly not to the Eastern and Central areas of the U.S.A.

MOBILE CORNER

(from page 27)

lighting circuit operating on the trailer battery is energized. At the same time the receiver is transferred to a d-c pack which supplies the plate voltage; filaments are switched directly to 6-volts d.c.

Receiving equipment has been the subject of much discussion, but by experience we have arrived at a combination which operates very satisfactorily. A selective receiver is *not* desirable for net operations, as many times the mobile station is not exactly on net frequency. This is due primarily to the differences in crystals (although they may be marked for the same spot frequency) and the circuits in which they are employed. The receiving combination employed is a VHF-152A converter operating into a 6.9 Mc. ARC-5 receiver. A noise limiter has been added to the ARC-5, and the combination provides excellent sensitivity with the desired band width. Of course, this combination is bound to suffer, should the band suddenly open during net operations.

At this point it might be interesting to give a cross-section of the average *Phil-Mont* mobile. A few mobiles are using converted ARC-5 receivers and home built converters, but the majority of mobiles seem to lean toward the commercial models in conjunction with the auto receiver. Transmitters are generally home built, with power inputs ranging from 6 to 25 watts, and a few at 150 watts. Crystal switching for rapid QSY is general, although dash-mounted transmitters usually provide a panel mounted crystal socket to accomplish the same purpose. The oscillator tube employed is generally either the 6V6, 6AQ5, or 6AC7, using a 7-Mc crystal to quadruple to 10-meters. Final amplifier tubes are usually the 6V6, 5763, 2E26, 807, or 6146. The 6V6, 6AQ5, or 6L6 are the usual choice of modulator tubes.

Carbon microphones of the F-1 type are most commonly used. A program of standardization has been initiated and most of the club mobiles have converted to a standard connection, thus in an emergency any microphone or handset can be used

with any other mobile station in the area, police and taxi included.

Antenna types and locations vary. The location which seems to have the least directional effect is one high on the rear of the body, usually on the left-rear. 50-ohm coaxial cable is used as the transmission line, and if a trunk transmitter is used, and electrical quarter-wave length or as short a length as possible, is best. Dash-mounted transmitters, in general, require approximately three-quarter wave-length transmission lines.

A-c, low-voltage, alternators, with rectifier and regulator belt driven from the engine, will prove most satisfactory for mobile use. The initial cost is high, but in the long run will prove to be an investment which will outlast several cars and may be installed in the new car should you trade. An alternative is a second generator, battery, and regulator specifically for the radio circuits. Otherwise, a heavy-duty battery of the 120- to 130-ampere hour capacity is recommended, and with judicious use of the transmitter and frequent generator inspection, no difficulties should be encountered.

This article has been an attempt to describe some of the phases of mobile radio as enjoyed by member of the *Phil-Mont Mobile Radio Club*. We sincerely hope that you, the reader, have received some benefit from our experiences. Should you be interested in any particular phase of our operations, or activities, feel free to write the club secretary for details.

ANTENNA HEIGHT

(from page 40)

db. stronger signal than the lower Yagi. This effect was originally difficult to interpret, but was finally resolved through the use of radio amateur data obtained in "Project RASO."²

Comparison With Theory

As mentioned earlier, the data shown in this article applies particularly to single hop transmission via the sporadic-E layer. Regardless of this singular method of obtaining the data, the results are undoubtedly applicable to "short-skip" and E-layer effects on other frequencies. Then, too, it also confirms the theoretical height above ground formulas, since one antenna was approximately $1\frac{3}{4}$ wavelength above ground that the other about 4 wavelengths above ground. For DX it still goes—the higher the better.

It was only after a considerable quantity of the RASO 6-meter Project data (under Air Force contracts AF19(122)-72 and AF19(122)-242 with the Air Force Cambridge Research Laboratories) had been analyzed that we were able to obtain any positive results at this range. Records then became available that showed the incidence of "double-hop" or multiple reflections over the paths greater than 1200 miles. Prior to this the small number of readings available were confusing. They showed a preference for the lower antenna where we had been led to suspect that the higher antenna would work out best. It was found that these readings were being taken over two 600-plus mile hops and thus were actually coming in better on the lower antenna.—Ed.

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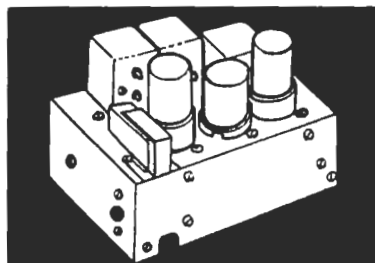
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